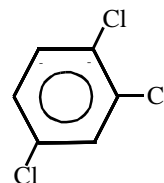


1,2,4-TRICHLOROBENZENE

1,2,4-Trichlorobenzene is a federal hazardous air pollutant and was identified as a toxic air contaminant in April 1993 under AB 2728.

CAS Registry Number: 120-82-1

Molecular Formula: $C_6H_3Cl_3$



1,2,4-Trichlorobenzene is a liquid which is volatile in steam. It is insoluble in water and is sparingly soluble in alcohol. It is miscible with ether, benzene, petroleum ether, and carbon disulfide. Hydrochloric acid and phosgene are thermal breakdown products of 1,2,4-trichlorobenzene (Merck 1983).

Physical Properties of 1,2,4-Trichlorobenzene

Synonyms: unsym-trichlorobenzene

Molecular Weight:	181.46
Boiling Point:	213 °C
Melting Point:	17 °C
Flash Point:	110 °C (230 °F) closed cup
Vapor Density:	6.26 (air = 1)
Density/Specific Gravity:	1.4634 at 25/25 °C (water = 1)
Vapor Pressure:	0.29 mm Hg at 25 °C
Log Octanol/Water Partition Coefficient:	4.02
Water Solubility:	48.8 mg/L at 20 °C
Henry's Law Constant:	1.42×10^{-3} atm-m ³ /mole
Conversion Factor:	1 ppm = 7.42 mg/m ³

(Howard, 1990; Merck, 1983; Sax, 1989; U.S. EPA, 1994a)

SOURCES AND EMISSIONS

A. Sources

1,2,4-Trichlorobenzene is used as a solvent, dielectric fluid, dye carrier, chemical intermediate, synthetic transformer oil, lubricant, and as a heat transfer medium (HSDB, 1993). It is also used in abrasive formulations, in wood preservatives, and in septic tank and drain cleaners. It is formed during the combustion of chlorine-containing polymers and is also a product of hexachlorobenzene dechlorination by anaerobic sewage sludge (HSDB, 1993).

The primary stationary sources that have reported emissions of 1,2,4-trichlorobenzene in California are manufacturers of electronic components and accessories.

B. Emissions

The total emissions of 1,2,4-trichlorobenzene from stationary sources in California are estimated to be at least 625 pounds per year, based on data reported under the Air Toxics “Hot Spots” Program (AB 2588) (ARB, 1997b).

C. Natural Occurrence

1,2,4-Trichlorobenzene is a synthetic organic chemical and is not known to occur naturally (Howard, 1990).

AMBIENT CONCENTRATIONS

No Air Resources Board data exist for ambient measurements of 1,2,4-trichlorobenzene. The United States Environmental Protection Agency (U.S. EPA) has compiled ambient air data from a United States urban location (1986) and in Lima, Ohio (1990-91). Mean concentrations of 1.28 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) or 0.17 parts per billion (ppb) in the urban location and less than 0.76 $\mu\text{g}/\text{m}^3$ (0.10 ppb) in Lima, Ohio were reported (U.S. EPA 1993a).

INDOOR SOURCES AND CONCENTRATIONS

No information about the indoor sources and concentrations of 1,2,4-trichlorobenzene was found in the readily-available literature.

ATMOSPHERIC PERSISTENCE

1,2,4-Trichlorobenzene is fairly stable in the atmosphere, and is not subject to appreciable direct photolysis (Howard, 1990). The calculated atmospheric half-life of 1,2,4-trichlorobenzene due to its gas-phase reaction with photochemically produced hydroxyl radicals is estimated to be 18 days (Atkinson, 1995).

AB 2588 RISK ASSESSMENT INFORMATION

1,2,4-Trichlorobenzene emissions are not reported from stationary sources in California under the AB 2588 program. It is also not listed in the California Air Pollution Control Officers Association Air Toxics “Hot Spots” Program Revised 1992 Risk Assessment Guidelines as having health values (cancer or non-cancer) for use in risk assessments (CAPCOA, 1993).

HEALTH EFFECTS

The probable routes of human exposure to 1,2,4-trichlorobenzene are inhalation and ingestion (Sittig, 1991).

Non-Cancer: Inhalation of vapors of 1,2,4-trichlorobenzene may cause irritation to the respiratory tract. Nervousness, restlessness, tremors, increased heart rate and blood pressure, weakness, digestive disturbances, weight loss, and headache are also symptoms of exposure to high levels of 1,2,4-trichlorobenzene (Sittig, 1991). Contact with the skin may cause severe irritation. High doses of 1,2,4-trichlorobenzene have shown adverse effects on the liver, kidneys, lungs, and the central nervous system (U.S. EPA, 1994a).

The U.S. EPA has established an oral Reference Dose (RfD) of 0.01 milligrams per kilogram per day for 1,2,4-trichlorobenzene based on increased adrenal weights in rats. The U.S. EPA estimates that consumption of this dose or less, over a lifetime, would not likely result in the occurrence of chronic, non-cancer effects. The Reference Concentration (RfC) for 1,2,4-trichlorobenzene is currently under review by the U.S. EPA (U.S. EPA, 1994a).

No information is available on adverse reproductive or developmental effects of 1,2,4-trichlorobenzene in humans. Oral exposure in rats has been reported in several studies to cause no adverse effects on fertility or viability, nor cause increased resorptions, embryoletality, or teratogenic effects (U.S. EPA, 1994a).

Cancer: No information is available on the carcinogenic effects of 1,2,4-trichlorobenzene in humans. The U.S. EPA has placed 1,2,4-trichlorobenzene in Group D: Not classifiable as to human carcinogenicity (U.S. EPA, 1993f). The International Agency for Research on Cancer has not classified 1,2,4-trichlorobenzene for carcinogenicity (IARC, 1987a).

